

WHAT IS CLAIMED IS:

1. A method for making a vertical-cavity surface emitting laser device for producing polarized light comprising the steps of:

providing a substrate;

forming a plurality of semiconductor layers on a surface of said substrate wherein one of said semiconductor layers comprises an active layer and another of said semiconductor layers comprises a current controlling layer having a first axis substantially orthogonal to a second axis in a plane substantially parallel to said surface of said substrate, said current controlling layer being penetrated by a plurality of non-conducting cavities;

forming an asymmetric aperture region in said current controlling layer which controls current flowing through said active region, said asymmetric aperture region being defined by a conductive region in said current controlling layer bordered by non-conductive regions in said current controlling layer such that a first dimension of said conductive region along said first axis is less than a second dimension of said conductive region along said second axis to produce light polarized in a preferred direction, and wherein each of said non-conductive regions surrounds at least one of said plurality of non-conducting cavities; and

forming first and second electrodes located on said laser device to enable biasing of said active region.

2. The method of Claim 1 wherein said surface of said substrate is misoriented with respect to the {100} and {111} planes of said substrate resulting in polarization directions of maximum gain and wherein said directions of maximum gain are substantially aligned with said preferred direction.

3. The method of Claim 1 wherein a cavity having a width and a length is positioned adjacent to said asymmetric aperture region such that said length of said cavity is substantially parallel to said second dimension of said conductive region.

4. The method of Claim 3 wherein said surface of said substrate is misoriented with respect to the {100} and {111} planes of said substrate resulting in polarization directions of maximum gain and wherein said directions of maximum gain are substantially aligned with said preferred direction

5. The method of Claim 1 wherein said first dimension of said conductive region is between 30% and 75% of said second dimension of said conductive region.

6. The method of Claim 1 wherein said first electrode is comprised of ITO.

7. The method of Claim 1 wherein said device is one of an array of substantially identical devices emitting light having substantially the same direction of polarization.

8. The method of Claim 2 wherein said device is one of an array of substantially identical devices emitting light having substantially the same direction of polarization.

9. The method of Claim 3 wherein said device is one of a plurality of devices arranged in an array such that at least one of said plurality of devices has a direction of polarization different from said device.

10. The method of Claim 8 wherein said first electrode is comprised of ITO.

11. The method of Claim 4 wherein said substrate misorientation is at least 4.1°.

12. The method of Claim 1 wherein said cavities are located at the vertices of a distorted octagon.

13. A method for making a vertical-cavity surface emitting laser device for producing polarized light comprising the steps of: